Allocation Hearing Exhibit 1027

1.

Electronically Filed
Docket: 14-CRB-0010-CD (2010-2013)

Filing Date: 02/12/2018 08:47:17 PM EST

TESTIMONY OF DR. ROBERT W. CRANDALL

QUALIFICATIONS

My name is Robert W. Crandall. I am the chairman of Criterion Economics and

have been a Senior Fellow in Economic Studies at the Brookings Institution since 1978. Prior to

that I was the Acting Director, Deputy Director, and Assistant Director of the Council of Wage

and Price Stability in the Executive Office of the President, and between 1974 and 1975 I was an

Adviser to Commissioner Glen Robinson of the Federal Communications Commission. I was an

Assistant Professor and Associate Professor of Economics at MIT between 1966 and 1974.

2. I have written widely on telecommunications policy, the economics of

broadcasting, and the economics of cable television. In 1971 and 1972, I published articles on the

FCC financial-interest/syndication rules in The Journal of Law and Economics and the Bell

Journal of Economics. In 1974, I coauthored an article on cable television profitability in The

Journal of Business. In 1974, I also published an article on the economics of network television

in Public Policy. In 1978, I published an article on the economic effect of television broadcast

regulation in Regulation. In 1981, Stanley Besen and I coauthored a paper on cable television

regulation that was published in Law and Contemporary Problems. In 1990, I conducted a

number of empirical studies of the cable television industry that were submitted in various FCC

proceedings on behalf of TCI and are incorporated into a chapter in Bruce Owen and Steven

CRITERION ECONOMICS, L.L.C.

Wildman's Video Economics, published by Harvard University Press in 1992. I am the co-author of two books released in 1996 by the Brookings Institution: Talk is Cheap: The Promise of Regulatory Reform in North American Telecommunications (with Professor Leonard Waverman) and Cable TV: Regulation or Competition? (with former FCC Commissioner Harold Furchtgott-Roth).

- 3. I have served as a consultant to several government agencies and participated in a variety of government advisory panels. Between 1967 and 1968, I was a consultant to the Justice Department on a variety of network television and motion picture issues. Between 1978 and 1979, I served as a consultant to the Federal Communications Commission (FCC) on the deregulation of signal carriage rules for cable television. I have also served a consultant to several clients on matters relating to copyright and product licensing issues—including the National Cable Television Association, the three major television broadcast networks, and other cable and broadcast industry clients.
- 4. I testified before the Copyright Royalty Tribunal on behalf of the Joint Sports Claimants ("JSC") in the 1989 cable royalty distribution proceeding and on behalf of the National Cable Television Association in the 1981 proceeding to adjust cable royalty rates. I also testified before the Copyright Arbitration Royalty Panel on behalf of JSC in the 1990-92 cable royalty distribution proceeding.
- 5. I am offering this testimony on behalf of JSC in my individual capacity and not as employee of the Brookings Institution, which does not take institutional positions with respect to specific legislation, litigation, or regulatory proceedings.
 - 6. A copy of my curriculum vitae is attached.

INTRODUCTION

- 7. In 1976, Congress created a compulsory license system that allows cable system operators to retransmit broadcast television signals without negotiating an agreement with the copyright holders for individual programs on those television signals. In return for the compulsory license, cable systems that retransmit any broadcast signals pay into one or more copyright royalty funds maintained by the U.S. Copyright Office. Owners of the rights to the non-network programming that is retransmitted on a distant signal basis on cable systems are entitled to claim the royalty funds. If all of the claimants to the royalty funds cannot agree on the distribution of these funds, disputes are resolved by a Copyright Arbitration Royalty Panel ("CARP", or "the Panel") appointed by the Copyright Office. Before the arbitration panel system was created, royalty claim disputes were resolved by a permanent Copyright Royalty Tribunal ("CRT").
- 8. At the time the compulsory license was instituted in 1976, the FCC restricted the number of distant signals that a cable system could carry. The FCC also subjected programming on distant signals to blackout if a local broadcaster had purchased exclusive rights to that programming. The FCC lifted these two restrictions in 1980, and in 1982, the CRT instituted two new cable royalty funds in addition to the "Basic Fund" to compensate copyright holders for the removal of these restrictions: the "3.75% Fund" and the "Syndex Fund." The Basic Fund consists of all royalties paid by "Form 1" and "Form 2" systems (those with less than \$292,000 in semi-annual gross receipts), plus the royalties paid by "Form 3" cable systems for carriage of distant signals that would have been permitted under the FCC's pre-1980 distant signal carriage rules. The 3.75% Fund consists of royalties paid by Form 3 systems for carriage of each distant signal that would not have been allowed under the FCC's former distant-signal carriage restrictions.

Cable systems pay into the Syndex Fund where they retransmit distant signal programming that would have been subject to blackout under the FCC's old syndicated exclusivity rules. Currently, only the Program Suppliers and Music Claimants receive proceeds from the Syndex Fund, which consists of less than \$100,000 per year.

9. Since Congress instituted the compulsory license, the CRT and CARP have presided over six "Phase I" disputes among the different classes of royalty claimants. In the last Phase I royalty distribution (involving the 1990, 1991 and 1992 funds), the three-member CARP reached a divided decision on, among other things, the JSC award. The CARP majority allocated JSC 29.5 percent of the Basic Fund and 32.6 percent of the 3.75% Fund. The third CARP member concluded that JSC should have received a larger share of each fund—30.5 percent of the Basic Fund and 38.5 percent of the 3.75% Fund. Table 1 displays the CARP's allocation of the Basic and 3.75% Funds in the 1990-92 proceeding.

TABLE 1: 1990-92 CARP ROYALTY AWARDS;

MAJORITY AND DISSENT Majority's Award* Dissent's Award* (%)(%) Claimant Basic 3.75% Basic 3.75% **JSC** 30.50 38.50 29.50 32.60 48.80 **Program Suppliers** 55.00 58.60 50.20 9.50 9.50 Commercial TV (NAB) 7.50 7.50 0.00 Public TV (PBS) 5.75 5.80 1.25 3.00 3.00 Devotionals 0.95 1.00 1.00 0.20 Canadians 0.35

*Note that the above numbers represent the CARP's allocation of the 1991 and 1992 royalties. The CARP's allocation of the 1990 royalties was only slightly different to account for the fact that the Canadian Claimants had settled for that year but not 1991-92. In addition, note that the Register of Copyrights reduced the final award to each of the above claimant group proportionately to account for settlements with other Phase I Claimants. The Librarian also slightly increased the JSC and Program Supplier shares, and decreased the Canadian share, of the 1991 and 1992 3.75% Funds to account for the fact that there is JSC and Program Supplier programming on Canadian signals. See Appendix A, showing the Librarian allocations.

Source: CARP Report on Cable Royalties for the Years 1990-92 at 143, 174-175 (May 31, 1996) [hereinafter CARP Report].

10. The CARP in the 1990-92 proceeding started by attempting to replicate the relative value that a market would assign each claimant's programming. In conducting that exercise, the CARP majority considered the survey of cable system operators undertaken by Bortz Media and Sports Group (the "Bortz survey") to be "highly valuable in determining market value." Nevertheless, the CARP majority's award to JSC (approximately 30 percent before the Register's adjustments) was between six and nine percentage points less than the shares reflected in the Bortz surveys for JSC programming. That disparity amounted to between \$30 and \$45 million for the years 1990-92. As reflected in Table 2 below, no other claimant group received an award in the 1990-92 proceeding that reflected such a substantial dollar reduction from its share in the Bortz surveys.

TABLE 2: COMPARISON OF 1990-92 CARP MAJORITY ROYALTY AWARDS AND 1990-92 CABLE OPERATOR SURVEY RESULTS

	Weighted	Cable Operator	Revenue
Claimant	Average* Award (%)	Survey Share (%)	(Shortfall)/Surplus (\$ Million)
JSC	30.3	36.3 – 38.8	(\$31.2 - \$44.1)
Program Suppliers	56.0		\$49.9 - \$80.8
Movies		25.6 - 30.1	
Series		14.5 - 16.0	
Commercial TV (NAB)	7.5	11.9 - 14.8	(\$22.6 – \$37.6)
Public TV (PBS)	4.2	2.7 - 3.0	\$7.0 - \$ 8.5
Devotionals	1.2	3.6 - 4.3	(\$12.5 - \$16.1)
Canadians	0.8	0.0 - 0.5	\$1.8 - \$4.3

Source: CARP Report at 50, 143; 61 Fed. Reg. 55655, 55662; Copyright Office Reports of

Note: The weighted average award is calculated by using revenue weights for each claimant's Basic and 3.75 Fund awards.

11. I have been asked by JSC to consider whether the CARP in the 1990-92 proceeding had an economically sound basis for awarding JSC significantly less than JSC's share in the Bortz surveys. For the reasons set forth below, I do not believe that there was such a

CARP Report at 23-25.

basis. In my opinion, the award to JSC should not have been less than the royalty share reflected in the Bortz surveys.

I. THE CARP SHOULD CONTINUE TO ALLOCATE THE CABLE ROYALTY FUNDS CONSISTENTLY WITH HOW THEY WOULD HAVE BEEN ALLOCATED IN A MARKET

- 12. Typically, a copyright holder of non-network programming on a broadcast station is directly compensated by that station. The broadcast station pays the copyright holder from the station's advertising revenues. When a cable system carries a "distant" broadcast station, the programming on that station is available to a larger audience than otherwise. A distant broadcast station, in general, is a station that is not located in the cable system's television market and whose carriage was not mandated under the FCC's 1976 or current "must carry" rules. Large transaction costs would make it difficult for cable systems to compensate the copyright holders of the many programs on these distant signals for the use of their programming.
- 13. Congress established compulsory licensing as a substitute for arms-length transactions between cable systems and individual copyright holders of distant-signal programming. These fees are distributed to the copyright owners whose non-network programming has been retransmitted on distant broadcast signals. Congress intended the compulsory license to be a more efficient way of compensating copyright owners by eliminating the transaction costs that would result from direct negotiations between cable systems and all of the copyright owners of programming retransmitted on distant signals.

2. Id. at 66.

- 14. In previous Phase I disputes, the CRT and CARP have decided that the allocation of royalties must be based on how copyright holders would have been compensated in a market environment. Although the "market" valuation standard has been constant, there have been some differences in how past distribution decisions have described the hypothetical market. The CRT's decision regarding the 1989 cable royalty distribution suggests a market in which cable system operators would buy programming from the copyright holders. The court of appeals took a similar view: that Congress intended the CRT (now CARP) to "operate as a substitute for direct negotiations . . . among cable operators and copyright owners." The CARP's decision regarding the 1990-92 cable royalty distribution describes a marketplace in which cable operators would buy programming from the distant signal broadcasters rather than directly from the copyright holders. A
- appropriate way to determine the royalty shares that should be awarded to each of the claimants. The compulsory license process was not designed to deprive the copyright owners of their relative shares of the market value of the imported programming. Moreover, because the issue that the CARP confronts is the relative valuation of different programming types, rather than the valuation of different distant signals as a whole, the CRT's formulation of the hypothetical market (one in which cable operators purchase programming directly from copyright holders) is more relevant.
- 16. In a competitive environment, a market transaction under either the CRT or the CARP's formulation would compensate a copyright holder according to the copyrighted

^{3.} Christian Broadcasting Network v. CRT, 720 F.2d at 1306.

program's *marginal* contribution to cable-system net revenues. In other words, the cable operator would be willing to buy rights to the programming directly or indirectly from the copyright holder according to how much additional revenue the cable operator would generate by retransmitting the copyrighted programming.

17. Determining this "market value" for specific types of programming is difficult. The compulsory license requires the cable operator to pay the full six-month royalty even if only a single program is retransmitted over that period. Moreover, the cable operator may not insert commercials or otherwise modify the distant signal. As a result, it is almost impossible to determine the precise marginal contribution to a cable system of a specific copyright holder's programming on a distant signal. Therefore, one must look for other evidence to estimate a hypothetical market between copyright holders and cable system operators.

II. THE BORTZ SURVEY OF CABLE OPERATORS REPRESENTS THE BEST APPROXIMATION OF A MARKET TRANSACTION BETWEEN A CABLE SYSTEM OPERATOR AND CLASSES OF COPYRIGHT HOLDERS

18. As I have explained in my prior testimony before the CARP, the best evidence of valuation of any specific programming type is the data provided by the Bortz survey. The survey aggregates opinions of cable operators who have chosen to retransmit programming and thus would have been the "buyers" in the hypothetical distant signal marketplace the CARP seeks to recreate. In past CRT and CARP proceedings, a variety of witnesses for JSC and other claimants, including NAB and PBS, have endorsed the Bortz methodology. ⁵ The cable system operators

^{4.} See CARP Report at 23-24.

^{5.} The 1989 CRT and 1990-92 CARP reports discuss the various witnesses who have supported the Bortz survey during those two proceedings. See CRT Report, 57 Fed. Reg. 15286 at 15292-95; and CARP Report at 45-

surveyed are responsible for knowing the demographics of their systems' markets and what types of programming will increase demand for subscriptions to these cable systems given their existing programming and subscriber bases. Therefore, these cable system operators should be able to make a reasonably accurate assessment of the value of a copyright holder's programming to their cable systems. From an economist's standpoint, sampling and aggregating the valuation opinions of buyers in the would-be marketplace provides a very robust model of how cable program budgets would have been spent in a market where programming on distant signals was being sold.

19. The Bortz data show that cable operators placed a very high value on sports programming in 1990-92 as well as 1998-99, a result that is not surprising. The sports programming of the JSC is unique in that it is live, first-run programming. Live sporting events lose most of their value immediately after they are first transmitted. A viewer has many opportunities to watch other types of programming, but he only has one opportunity to watch a live sporting event. In addition, sports fans are intensely loyal and identify personally with sports teams. Distant signals also provide a *new* source of live sports programming for viewers, whereas viewers can often see other programs on both the distant signals and on other local broadcast stations or cable networks. Cable system operators do not need distant signals for this

_

^{54.} The witnesses include Paul I. Bortz (1989; 1990-92; testifying for JSC); market researcher Dr. Joel Axelrod (1990-92; testifying for JSC); University of Georgia economist Dr. Leonard Reid (1989; testifying for JSC); market researcher Dr. Samuel Book (1989; testifying for JSC); Northwestern University economist Dr. Stephen Wildman (1990-92; testifying for NAB); Vanderbilt University economist Dr. David Scheffman (1990-92 testifying for PBS); Boston University economist Dr. Michael Sallinger (1990-92; testifying for Devotionals); Statistician Dr. William Fairley (1990-92; testifying for PBS); Cable executive Dr. David Clark (1990-92; testifying for Devotionals); NAB Vice President of Research Dr. Richard Ducey (1990-92; testifying for NAB); PBS Research Director John Fuller (1990-92; testifying for PBS); valuation expert Paul Much (1990-92; testifying for NAB).

duplicate programming; it will not have the effect on subscription revenues that live sporting events have.

III. ALTHOUGH THE 1990-92 CARP RELIED ON THE BORTZ SURVEY TO SIMULATE AN EFFICIENT ALLOCATION OF THE ROYALTY FUNDS, IT UNDERVALUED SPORTS PROGRAMMING

- 20. As noted above, the 1990-92 CARP was split with two arbitrators issuing a majority report and the third arbitrator dissenting. The majority report found the Bortz data to be "highly valuable" but awarded the Joint Sports Claimants roughly six to nine percentage points (depending on the year) less of the Basic Fund than the Bortz results suggested (see Tables 1 and 2). The majority report cited one primary criticism of the Bortz survey in deciding not to tie the awards more closely to the Bortz survey—namely, that Bortz only examined "attitudes" of cable system operators, and thereby failed to incorporate any "supply side" effects of copyright holders into its calculation. As I discuss briefly below, from an economic perspective, this criticism is without merit, and even if it were true, would not support a negative deviation from the Bortz data for JSC. The third arbitrator rejected this concern and supported a higher award for JSC that was more consistent with the Bortz analysis.
- 21. The Majority in the 1990-92 CARP criticized the Bortz survey because it measured "attitudes rather than conduct." The Panel was correct that the survey does not attempt to measure actual conduct other than conduct and experience that is reflected in the estimations provided by the survey respondents. Because the compulsory license system obviates arms-length negotiations for distant-signal programming, the actual conduct never happens and accordingly cannot be surveyed. The Panel has recognized that, in addition to the Bortz survey,

there are marketplace decisions (for example, cable system payments for particular cable network programming) that may be relevant indicators of the relative value of the claimants' programming but which do not directly address the question that the Panel must resolve.

- 22. The claim that Bortz fails to incorporate the actual competitive interactions among cable operators and copyright holders is no different from the claim that Bortz fails to incorporate "supply side" effects. The Majority said that the relevant question was "what would the cable system operator have to and be willing to spend. While the operator may be willing to spend a certain amount of its budget for a given category of programming, the market supply may be at odds with what the operator is willing to spend." These two panelists did not further elaborate on what they meant by "supply side" considerations; nor did they explain why the "supply side" concern would affect JSC or any other particular claimant group more than another.
- 23. The panelists appear to suggest that the motivations of the seller might not be captured by the Bortz survey—that is, some claimant groups might demand more than what the cable operators were willing to spend and that others might demand less. I have carefully reviewed the 1990-92 CARP report and have found nothing in that report to suggest that JSC's likely motivations justified a reduction in JSC's royalty share as reflected in the Bortz survey. The panelists did not cite to, and I am not aware of, any evidence that JSC's relative willingness to supply programming would have resulted in a lower share of royalty revenues than was

^{6.} *Id.* at 66.

^{7.} *Id*

reflected in the Bortz survey. Indeed, the dissenting opinion correctly rejected these arguments, explaining that the "careful structure of the compulsory license itself plays a significant role in helping to define the marketplace, including the supply side," and likening the supply side of this marketplace to a "forced sale situation." The dissenting opinion understood that copyright owners could not restrict supply in a but-for world in which cable system owners negotiated directly with copyright holders—hence, any supply side effects would be negated.

24. Even if copyright holders could restrict supply on distant signals, there is no evidence to suggest that cable system operators would spend more or less on sports programming than their Bortz share. Indeed, when it comes to negotiating with cable operators, sports programmers could be no "weaker" than broadcasters in securing a large share of expenditures. Broadcasters have demonstrated a greater interest in securing carriage on cable systems and making their programming available to as many cable system subscribers as possible at the lowest possible price. I am not aware of any similar evidence of JSC members. Accordingly, these supply side considerations would not support a similar reduction from the Bortz results for JSC programming.

^{8.} There is a discussion of the JSC case in the CARP Report at 86-100 that does not explain why the "supply side" concern would cause a deviation from the Bortz results just for JSC. The only other studies considered by the CARP presented viewing data which, as I have explained in prior testimony, do not measure value.

See CARP Report at 172.

IV. THE 1990-92 MAJORITY CARP DECISION DID NOT JUSTIFY AN AWARD OF THE 3.75% FUND LOWER THAN THE AWARD SUGGESTED BY THE BORTZ SURVEY RESULTS

- 25. The Register of Copyrights noted that the 1990-92 CARP's discussion of its allocation of the 3.75% Fund was "at best, terse." Even after consulting further with the Panel regarding its 3.75% Fund award to JSC, the Register found the Panel's reasoning "troublesome." It appears that the Panel simply applied its Basic Fund award allocations to the 3.75% Fund after accounting for those claimants who had no programming that generated 3.75% Fund payments. As a result, the shortcomings in the Panel's Basic Fund award to JSC which I have discussed above are also reflected in the 3.75% Fund award to JSC. In neither instance does the Panel articulate a reason for its downward departure from the value ascribed to JSC programming by the Bortz survey.
- 26. Moreover, the Panel apparently did not address the fact that the mix of distant signals generating payments to the 3.75% Fund was different than the mix of distant signals generating Basic Fund payments. I understand that JSC contended in 1990-92 that the 3.75% Fund distant signals were more heavily weighted towards signals carrying JSC programming than were the Basic Fund signals. If that were the case, I would expect that the JSC award would have been proportionally higher with respect to the 3.75% Fund.

CONCLUSION

27. The CARP should continue to allocate the cable royalty funds by attempting to simulate free-market transactions between copyright holders of distant-signal programming and cable system operators. The Bortz survey is the best tool available to simulate these transactions.

^{10. 61} Fed. Reg. at 55662 (Oct. 28, 1996).

The CARP should recognize that any limitations of the survey do not negatively affect the JSC more than any other claimant. In previous decisions, the CRT and CARP have not justified their reluctance to award the JSC the share of the royalty funds implied by the Bortz survey results. The CARP should award JSC shares of the Basic and 3.75% Funds that are no lower than the Bortz survey results.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. Executed at Washington, D.C. on this 24th day of November, 2002

Robert W. Crandall

11. *Id*.

APPENDIX A: THE LIBRARIAN'S ALLOCATIONS

1990	Basic Fund	3.75% Fund
Program Suppliers	52.633625%	56.0125439%
JSC	28.235500%	31.1605620%
NAB	7.182050%	7.1688409%
Music Claimants	4.500000%	4.5000000%
PBS	5.504975%	-
Devotional Claimants	1.193850%	0.9080532%
Canadian Claimants	0.750000%	0.2500000%
1991-1992	Basic	3.75 Percent
Program Suppliers	52.52500%	56.0131375%
JSC	28.17250%	31.2299325%
NAB	7.16250%	7.1625000%
Music Claimants	4.50000%	4.5000000%
PBS	5.49125%	-
Devotional Claimants	1.19375%	0.9072500%
Canadian Claimants	0.95500%	0.1871800%

Source: 61 Fed. Reg. 55669.

ROBERT W. CRANDALL

CURRENT POSITION:

Senior Fellow, The Brookings Institution, 1978 - Present

ADDRESS:

1775 Massachusetts Ave., NW Washington, DC 20036

Phone No: 202-797-6291 Fax. No.: 202-797-6181 e-mail: rcrandall@brook.edu

FIELDS OF SPECIALIZATION:

Industrial Organization, Antitrust Policy, Regulation

PREVIOUS POSITIONS:

Adjunct Professor, School of Public Affairs, University of Maryland, 1987 - 1993 Deputy Director, Council on Wage and Price Stability, 1977 - 1978 Acting Director, Council on Wage and Price Stability, 1977 Adjunct Associate Professor of Economics, George Washington University, 1975 - 1977

Assistant Director, Council on Wage and Price Stability, 1975 - 1977
Associate Professor of Economics, M.I.T., 1972 - 1974
Assistant Professor of Economics, M.I.T., 1966 - 1972
Johnson Research Fellow, The Brookings Institution, 1965 - 1966
Instructor, Northwestern University, 1964 - 1965
Consultant to Environmental Protection Agency, Antitrust Division Federal Trade Commission, Treasury Department, various years

EDUCATION:

Ph.D., Economics, Northwestern University, 1968 M.A., Economics, Northwestern University, 1965 A.B., Economics, University of Cincinnati, 1962

HONORS and AWARDS:

Phi Beta Kappa

MEMBERSHIPS:

American Economic Association Board of Directors, Baltimore Life Insurance Company Chairman, Criterion Economics, LLC

PERSONAL DATA:

Place and Date of Birth: Akron, Ohio; February 28, 1940

Home Address: 5100 - 38th Street, NW

Washington, DC 20016

PUBLICATIONS:

Books:

Should We Regulate Broadband? (edited with James Alleman), AEI Brookings Joint Center for Regulatory Studies, 2002, forthcoming.

<u>Telecommunications Liberalization on Two Sides of the Atlantic.</u> (with Martin Cave) AEI Brookings Joint Center for Regulatory Studies, 2001.

Who Pays for Universal Service? When Telephone Subsidies Become Transparent. (with Leonard Waverman) Washington: The Brookings Institution, 2000.

<u>Cable TV: Regulation or Competition?</u> (with Harold Furchtgott-Roth), Washington: The Brookings Institution, 1996.

<u>Talk is Cheap: The Promise Of Regulatory Reform in North American</u>
<u>Telecommunications</u>. (with Leonard Waverman) Washington: The Brookings Institution, 1996.

The Extra Mile: Rethinking Energy Policy for Automotive Transportation. (with Pietro S. Nivola) Washington, DC: The Brookings Institution/Twentieth Century Fund, 1995.

Manufacturing on the Move. Washington, DC: The Brookings Institution, 1993.

After the Breakup: The U.S. Telecommunications Industry in a More Competitive Era. Washington, DC: The Brookings Institution, 1991.

Changing the Rules: Technological Change, International Competition and Regulation in Communications. (Edited with Kenneth Flamm), Washington, DC: The Brookings Institution, 1989.

Up from the Ashes: The Rise of the Steel Minimill in the United States. (With Donald F. Barnett), Washington, DC: The Brookings Institution, 1986.

Regulating the Automobile. (With Howard K. Gruenspecht, Theodore E. Keeler, and Lester B. Lave), Washington, DC: The Brookings Institution, 1986.

Controlling Industrial Pollution: The Economics and Politics of Clean Air. Washington, DC: The Brookings Institution, 1983.

The Scientific Basis of Health and Safety Regulation. (Ed. with Lester Lave), Washington, DC: The Brookings Institution, 1981.

The U.S. Steel Industry in Recurrent Crisis. Washington, DC: The Brookings Institution, 1981.

Articles, Reports, and Contributions to Edited Volumes:

"Does Antitrust Policy Improve Consumer Welfare? Assessing the Evidence," *Journal of Economic Perspectives*, 2003, forthcoming.

"Injunctive Relief in Sherman Act Monopolization Cases," (with Kenneth G. Elzinga) Journal of Research in Law and Economics, 2003, forthcoming

"The Case against Asymmetric Regulation of Broadband," *Berkeley Technology Law Journal*, Vol. 17, No. 3, Summer 2002.

"Universal Service, Equal Access, and the Digital Divide," <u>Bridging the Digital Divide</u>. Hitachi Public Affairs Forum, California Council on Science and Technology, May 2001, pp. 29-38.

"Telecommunications Policy Reform in the United States and Canada," (with Thomas W. Hazlett) in Martin Cave and Robert W. Crandall (eds.), <u>Telecommunications</u>
<u>Liberalization on Two Sides of the Atlantic</u>, AEI/Brookings Joint Center for Regulatory Studies, 2001.

"The Failure of Structural Remedies in Sherman Act Monopolization Cases," <u>Oregon Law Review</u>, Spring 2001, pp. 109-98.

- "Sports Rights and the Broadcast Industry" (with Martin Cave), <u>The Economic Journal</u>, Vol. 111, February 2001, pp. F4-F26.
- "Bridging the Digital Divide Naturally," <u>Brookings Review</u>, Winter 2001, pp. 38-43.
- "Local and Long Distance Competition: Replacing Regulation with Competition," in Randolph J. May and Jeffrey A. Eisenach (eds.), <u>Telecommunications Deregulation and FCC Reform: What Comes Next?</u> Washington: The Progress and Freedom Foundation, 2000.
- "Competition in U.S. Telecommunications Services: Effects of the 1996 Legislation," (with Jerry Hausman) in Sam Peltzman and Clifford Winston (eds.), <u>Deregulation of Network Industries</u>, Washington: The Brookings Institution, 2000.
- "Competition in Telecom: The U.S. and Canadian Paths," (with Leonard Waverman) in Dale Orr and Thomas R. Wilson (eds.), <u>The Electronic Village: Policy Issues in Telecommunications</u>. Toronto: C.D. Howe Institute, 1998.
- "New Zealand Spectrum Policy: A Model for the United States?" The Journal of Law and Economics, October 1998, pp. 821-839.
- "The Impact of Telecommunications Deregulation on Midsize Business," in Gary D. Libecap (ed.), Advances in the Study of Entrepreneurship, Innovation, and Economic Growth: Legal, Regulatory, and Policy Changes that Affect Entrepreneurial Midsize Firms. Stamford, CT: JAI Press, 1998, pp. 23-42.
- "Telephone Subsidies, Income Redistribution, and Economic Welfare," in Roger G. Noll and Monroe E. Price, <u>A Communications Cornucopia: Markle Foundation Essays</u> on Information Policy. Washington: The Brookings Institution, 1998.
- "Electric Restructuring and Consumer Interests: Lessons from Other Industries," <u>The Electricity Journal</u>, Volume 11, No. 1, January/February 1998.
- "Is it Time to Eliminate Telephone Regulation?" in Donald L. Alexander (ed.), Telecommunications Policy: Have Regulators Dialed the Wrong Number?, Westport, CT: Praeger, 1997, pp. 17-30.
- "Competition and Regulation in the U.S. Video Market," <u>Telecommunications Policy</u>, Vol. 21, No. 7, 1997, pp. 649-660.
- "Are We Deregulating Telephone Services? Think Again." <u>Brookings Policy Brief</u>, Number 13, March 1997

"Are Telecommunications Facilities 'Infrastructure?' If They Are, So What? <u>Regional</u> Science and Urban Economics, 27 (1997), pp. 161-79.

Economic Deregulation and Customer Choice: Lessons for the Electric Utility Industry. (with Jerry Ellig), Center for Market Processes, George Mason University, 1997.

- "Telecom Mergers and Joint Ventures in an Era of Liberalization," in Gary Clyde Hufbauer and Erika Wada(eds.) <u>Unfinished Business: Telecommunications After the Uruguay Round</u>. Washington, DC: Institute for International Economics, 1997, pp. 107-24.
- "From Competitiveness to Competition: The Threat of Minimills to Large National Steel Companies," Resources Policy, Vol. 22, Nos. 1/2, March/June 1996, pp.107-118.
- "Clearing the Air: EPA's Self-Assessment of Clean-Air Policy," (with Frederick H. Rueter and Wilbur A. Steger), Regulation, 1996, Number 4, pp. 35-46.
- "Phone Rates in a Deregulated Market," The Brookings Review, Summer 1996.
- "Competition and Regulatory Policies for Interactive Broadband Networks," (with J. Greory Sidak), Southern California Law Review, July 1995.
- "The Unregulated Infobahn," (with J. Gregory Sidak), Policy (New Zealand), Winter 1995.
- "Managing the Transition to Deregulation in Telecommunications," in Steven Globerman, W.T. Stanbury, and Thomas A. Wilson (eds.), <u>The Future of Telecommunications Policy in Canada</u>. University of British Columbia and the University of Toronto, 1995.
- "Productivity Growth in the Telephone Industry Since 1984," (with Jonathan Galst) in Patrick Harker (ed.), <u>The Service Productivity and Quality Challenge</u>, Dodrecht: Kluwer Academic Publishers, 1995, Chapter 14.
- "Cable Television: Reinventing Regulation," <u>The Brookings Review</u>, Winter 1994, pp. 12-15.
- "Explaining Regulatory Policy" (with Clifford Winston), <u>Brookings Papers on Economic Activity</u>, <u>Microeconomics</u>, 1994, pp. 1-31.
- "Pricing Issues in Telecommunications," <u>Maine Policy Review</u>, Vol. 3, No. 1, May 1994.

- "Regulation and the "Rights" Revolution: Can (Should) We Rescue the New Deal?" Critical Review, Vol. 7 Nos. 2-3, 1993, pp. 193-204.
- "Comment: Transactions Prices," <u>Price Measurement and Their Uses</u>, (Murray F. Foss, Marilyn E. Manser, and Allan H. Young, eds.), University of Chicago Press, 1993.
- "Pollution Controls" in David R. Henderson (ed.), <u>The Fortune Encyclopedia of</u> Economics, New York: Warner Books, 1993.
- "Relaxing the Regulatory Stranglehold on Communications," <u>Regulation</u>, Summer 1992, pp. 26-35.
- "Regulating Communications: Creating Monopoly While Protecting Us From It," <u>The Brookings Review</u>, Summer 1992, Volume 10, No. 3, pp. 34-39.
- "Policy Watch: Corporate Average Fuel Economy Standards," <u>Journal of Economic</u> Perspectives, Spring 1992, pp. 171-80.
- "Why Is the Cost of Environmental Regulation So High?" Center for the Study of American Business. St. Louis: Washington University, Policy Study No. 110, February 1992.
- "Liberalization Without Deregulation: Telecommunications Policy During the 1980s," Contemporary Policy Issues, October 1991.
- "Halfway Home: U.S. Telecommunications (De)Regulation in the 1970s and 1980s," in Jack High (ed.), <u>Regulation: Economic Theory and History</u>. Ann Arbor: The University of Michigan Press, 1991.
- "Efficiency and Productivity," in Barry G. Cole (ed.), After the Breakup: Assessing the New Post-AT&T Divestiture Era. New York: Columbia University Press, 1991.
- "The Politics of Energy: New Fuel Economy Standards?" (with John D. Graham), <u>The American Enterprise</u>, March/April 1991.
- "The Clean Air Act at Twenty," <u>Journal of Regulation and Social Costs</u>, September 1990.
- "Fragmentation of the Telephone Network" in Paula Newberg (ed.), New Directions in Telecommunications Policy. Durham, NC: Duke University Press, 1989.
- "The Effect of Fuel Economy Standards on Automobile Safety," (with John D. Graham), Journal of Law and Economics, April 1989.

- "Surprises from Telephone Deregulation and the AT&T Divestiture," <u>American</u> Economic Review, May 1988, pp. 323-327.
- "The Regional Shift of U.S. Economic Activity" in Robert E. Litan, et al., American Living Standards, Washington, DC: The Brookings Institution, 1988.
- "Deregulation and Divestiture in the U.S. Telecommunications Sector" in Economic Deregulation: Promise and Performance. Proceedings of the 1987 Donald S. MacNaughton Symposium, Syracuse University, 1988.
- "Whatever Happened to Deregulation?" in David Boaz (ed.), <u>Assessing the Reagan</u> Years. Washington, DC: The CATO Institute, 1988.
- "Regulatory Reform: Are We Ready for the Next Phase?" in <u>The Brookings Review</u>, The Brookings Institution, Winter 1988/89.
- "Telecommunications Policy in the Reagan Era," <u>Regulation</u>, Washington, DC: American Enterprise Institute, 1988, Number 3, pp. 18-19.
- "A Sectoral Perspective: Steel" in Robert M. Stern, et.al. (eds.), Perspectives on a U.S.-Canadian Free Trade Agreement, Washington, DC: The Brookings Institution, 1987.
- "The Effects of U.S. Trade Protection for Autos and Steel," <u>Brookings Papers on</u> Economic Activity, 1987:2, The Brookings Institution.
- "Has the AT&T Breakup Raised Telephone Rates?" in <u>The Brookings Review</u>, Winter 1987.
- "Public Policy and the Private Auto," (with Theodore E. Keeler) in Gordon, et.al. (eds.), Energy: Markets and Regulation, Essays in Honor of M.A. Adelman. Cambridge, MA: MIT Press, 1986
- "Materials Economics, Policy, and Management: An Overview," with Michael B. Bever, in Encyclopedia of Materials Science and Engineering, Pergamon Press, 1986.
- "Metals Industries: International Structure," in <u>Encyclopedia of Materials Science and</u> Engineering, Pergamon Press, 1986.
- "The Steel Industry in Transition," <u>Materials and Society</u>, Pergamon Journals Ltd., Vol. 10, No. 2, 1986.

- "The Public Interest in Metals Policy," in David A. Gulley and Paul Duby (eds.), <u>The Changing World Metals Industries</u>. New York: Gordon and Breach, 1986.
- "Economic Rents as a Barrier to Deregulation," <u>The CATO Journal</u>, Spring/Summer 1986.
- "The Transformation of U.S. Manufacturing," <u>Industrial Relations</u>, Spring 1986. "Investment and Productivity Growth in the Steel Industry: Some Implications for Industrial Policy," in Walter H. Goldberg, <u>Ailing Steel: The Transoceanic</u> Quarrel, Gower, 1986.
- "The EC-US Steel Trade Crisis," in Loukas Tsoukalis (ed.), <u>Europe</u>, <u>America</u>, and the World Economy, Oxford: Basil Blackwell, 1986.
- "Why Should We Regulate Fuel Economy at All?" in <u>The Brookings Review</u>, Spring 1985.
- "An Acid Test for Congress," Regulation, September/December 1984.
- "Import Quotas and the Automobile Industry: The Costs of Protectionism," <u>The</u> Brookings Review, Summer 1984.
- "Automobile Safety Regulation and Offsetting Behavior: Some New Empirical Estimates," (with John D. Graham), American Economic Review, Papers and Proceedings, May 1984.
- "The Political Economy of Clean Air: Practical Constraints on White House Review," in V. Kerry Smith, Environmental Policy Under Reagan's Executive Order: The Role of Benefit-Cost Analysis, University of North Carolina Press, 1984.
- "The Marketplace: Economic Implications of Divestiture," (with Bruce M. Owen), in Harry M. Shooshan III, <u>Discounting Bell: The Impact of the AT&T Divestiture</u>, Pergamon Press, 1984.
- "Environmental Policy in the Reagan Administration," (with Paul R. Portney), in Paul R. Portney (ed.), Natural Resources and the Environment: The Reagan Approach, The Urban Institute and Resources for the Future, 1984.
- "The Emerging Competition in the U.S. Telecommunications Market" in New Opportunities for Entrepreneurship, The Kiel Institute, 1984.
- "Deregulation: The U.S. Experience," Zeitschrift für die gesamte Staatswissenshaft, October 1983, pp. 419 434.
- Review of John Zysman and Laura Tyson, <u>American Industry in International</u> Competition, Science, Vol. 222, October 21, 1983.

"Air Pollution, Environmentalists, and Coal Lobby," in Roger G. Noll and Bruce M. Owen (eds.), <u>The Political Economy of Deregulation</u>, American Enterprise Institute, 1983.

"The Use of Environmental Policy to Reduce Economic Growth in the Sun Belt: The Role of Electric-Utility Rates" in Michael A. Crew (ed.), <u>Regulatory Reform and Public Utilities</u>, Lexington Books, 1982.

"The Cost of Automobile Safety and Emissions Regulation to the Consumer: Some Preliminary Results," (with Theodore E. Keeler and Lester B. Lave), <u>American</u> Economic Review, May 1982.

"Environmental Policy," Regulation, March/April 1982.

"Has Reagan Dropped the Ball?" in Regulation, November/December 1981.

"The Use of Cost-Benefit Analysis in Regulatory Decision-Making," <u>Annals New York Academy of Sciences</u>, 1981. "The Deregulation of Cable Television," (with Stanley M. Besen), <u>Law and Contemporary Problems</u>, Duke University School of Law, Vol. 44, No. 1, Winter 1981.

"The Impossibility of Finding a Mechanism to Ration Health Care Resources Efficiently" in A New Approach to the Economics of Health Care, Mancur Olson (ed.), American Enterprise Institute for Public Policy Research, 1981.

"Pollution Controls and Productivity Growth in Basic Industries" in <u>Productivity</u> Measurement in Regulated Industries, Academic Press, 1981.

"Where is the Public Interest in Broadcasting Regulation?" in Regulation and the Future Economic Environment-Air to Ground, Charles F. Phillips, Jr. (ed.), December 1980.

"The Environmental Protection Agency," (On Saving the Kingdom: Advice for the President-Elect), Regulation, November/December 1980.

"Steel Imports: Dumping or Competition?" in Regulation, July/August 1980.

"Regulation and Productivity Growth" in <u>Proceedings: Conference on Productivity</u>, Federal Reserve Bank of Boston, Martha's Vineyard, June 1980.

"The Prospects for Regulatory Reform," Government Regulation: New Perspectives, Andrew Blair, ed., Pittsburgh: University of Pittsburgh, 1980.

- "The Economics of the Current Steel Crisis in OECD Member Countries" in <u>Steel in</u> the 80's, Organisation for Economic Co-operation and Development, Paris, 1980.
- "Environmental Control Is Out of Control," <u>Chemical and Engineering News</u>, Vol. 57, April 23, 1979.
- "Paying for Government Policy Through the Price Level" in Clarence C. Walton (ed.), Inflation and National Survival, 1979.
- "Is Government Regulation Crippling Business?" in <u>Saturday Review</u>, January 20, 1979.
- "Federal Government Initiatives to Reduce the Price Level," <u>Brookings Papers on</u> Economic Activity, 1978:2.
- "Competition and 'Dumping' in the U.S. Steel Market," Challenge, July/August 1978.
- "Regulation of Television Broadcasting: How Costly is the 'Public Interest'?" in Regulation, January/February 1978.
- "Placing a Value on the Electromagnetic Spectrum: A Suggested Approach for FCC Decision-Making," <u>Proceedings of the Conference on Telecommunications Policy</u> Research, Airlie House, 1977.
- "Theoretical Issues in the Regulation of Communications Common Carriage" in <u>Rate of Return Regulation</u>, FCC Future Planning Conference, July 1976.
- "The Postwar Performance of the Motion Picture Industry," <u>The Antitrust Bulletin</u>, Spring 1975.
- "An Econometric Model of the Low-Skill Labor Market," (with C.D. MacRae and Lorene Y.L. Yap), The Journal of Human Resources, Winter 1975.
- "The Economic Case for a Fourth Commercial Television Network," <u>Public Policy</u>, Harvard University Press, Fall 1974.
- "The Profitability of Cable Television: An Analysis of Acquisition Prices," The Journal of Business, University of Chicago, October 1974.
- "A Reexamination of the Prophecy of Doom for Cable Television," (with Lionel L. Fray), The Bell Journal of Economics and Management Science, Spring 1974.
- "Monopoly," The Dictionary of American History, Charles Scribner's & Sons, 1973.

"FCC Regulation, Monopsony, and Network Television Program Costs," <u>The Bell</u> Journal of Economics and Management Science, Autumn 1972.

Study Guide for Basic Economics (with R.S. Eckaus), Little, Brown and Company, 1972.

<u>Contemporary Issues in Economics: Selected Readings</u> (with R.S. Eckaus), Little, Brown and Company, 1972.

"Economic Subsidies in the Urban Ghetto," (with C.D. MacRae), <u>Social Science</u> Quarterly, December 1971.

"The Economic Effect of Television-Network Program 'Ownership'," <u>The Journal of</u> Law and Economics, Vol. XIV, October 1971.

"The Decline of the Franchised Dealer in the Automobile Industry," <u>The Journal of Business</u>, University of Chicago, January 1970.

"Motor Vehicle Repair, Repair-Parts Production, and the Franchised Vehicle Dealer," <u>Hearings: The Automobile Industry</u>, U.S. Senate Antitrust Subcommittee of the Committee on the Judiciary, 1969.

"Vertical Integration and the Market for Repair Parts in the United States Automobile Industry," The Journal of Industrial Economics, Oxford: Basil Blackwell, July 1968.

Certificate of Service

I hereby certify that on Monday, February 12, 2018 I provided a true and correct copy of the Robert Crandall Written Direct Testimony (JSC Written Direct Statement Vol. II) to the following:

Public Broadcasting Service (PBS), represented by Lindsey L. Tonsager served via Electronic Service at Itonsager@cov.com

National Association of Broadcasters (NAB), represented by John Stewart served via Electronic Service at jstewart@crowell.com

Broadcast Music, Inc. (BMI), represented by Joseph DiMona served via Electronic Service at jdimona@bmi.com

SESAC, Inc., represented by John C. Beiter served via Electronic Service at jbeiter@lsglegal.com

MPAA-represented Program Suppliers, represented by Lucy H Plovnick served via Electronic Service at lhp@msk.com

Devotional Claimants, represented by Benjamin S Sternberg served via Electronic Service at ben@lutzker.com

Spanish Language Producers, represented by Brian D Boydston served via Electronic Service at brianb@ix.netcom.com

Canadian Claimants Group, represented by Victor J Cosentino served via Electronic Service at victor.cosentino@larsongaston.com

National Public Radio, Inc. (NPR), represented by Gregory A Lewis served via Electronic Service at glewis@npr.org

American Society of Composers, Authors and Publishers (ASCAP), represented by Sam Mosenkis served via Electronic Service at smosenkis@ascap.com

Multigroup Claimants, represented by Brian D Boydston served via Electronic Service at brianb@ix.netcom.com

Signed: /s/ Michael E Kientzle